Abstracts

Coupling Characteristics Between Single-Mode Fiber and Square Law Medium

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The coupling characteristics between a single-mode fiber and a square law medium are theoretically and experimentally discussed in order to obtain the optimum coupling design for a variety of single-mode fiber optical devices using square law media. In theoretically analyzing coupling efficiency, it has been possible to evaluate a Gaussian beam, in a dielectric, which has passed through a square law medium with the help of mode-expansion technique and one of the generating functions of the Hermite polynomials. As a result, it has been possible to analytically obtain coupling efficiency even when the output beam from the single-mode fiber is off-axis and tilted. Through this analysis, it has been made clear that the ray matrix analysis used previously agrees with the analysis without the off-axis and tilt factors analyzed in this paper. The experimental results concerning the optimum coupling design, the off-axis characteristics, and the off-axis tolerances have been presented and agree well with the theoretical analysis.

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